This was not the best spring to be a tomato transplant. Frost, chilling temperatures, wind, hail – it’s been a tough start. Sometimes transplants also get challenged by the herbicide in these backward conditions.

We can’t do much about the weather, but we can test our knowledge in the Blame Game. Can you diagnose the cause of the damage in the following photos? The choices are metribuzin injury, frost, wind desiccation, and chilling injury.

If you chose wind desiccation, chilling injury, or frost, you’re probably partly right for any of these photos. It’s likely a combination of these factors that is causing the symptoms. If you chose metribuzin injury for photo A or D, you’re incorrect. These photos were taken in plots that have not received any preplant or post-emerge herbicide. The symptoms look identical to Photos B and C, which received Dual + Sencor, pre-plant incorporated. So although the symptoms look like metribuzin injury, in this case we can know for sure that it is not.

For more info see ‘Herbicide Injury—What should I do now?’ on page 3.
Your scout reports odd-looking plants in one area of the field. You suspect that herbicide drift is the cause. What are your first steps?

**Diagnose the problem:**
- Possible causes: Disease, insect, nutrient deficiency, herbicide carryover, environmental stress - may be similar to herbicide drift.
- Patterns in the field:
  * Worse next to the spray source, less damage across the field.
  * Patchy? Check soil pH. If of low or high pH, test for herbicide carryover.
- Weed symptoms in crop and fence lines:
- Evidence of spray application: wheel tracks, boom patterns, overlap on headlands - neighbouring fields, lawns, ditches, etc.

**Contact the appropriate people:**
- Talk to your neighbour or sprayer operator. Ask what was sprayed, when it was applied, (and who did the application).
- Contact your regional Ministry of the Environment office – MOE officers can do a site visit, take samples of tissue and soil, and have them analyzed for the suspect herbicides. Where appropriate, the offending applicator may face charges under the Pesticide Act.
- Contact your insurance adjustor, and advise the applicator to contact theirs.

**Document all details of the problem:**
- Collect spray records (yours - to prove it wasn’t your sprays) and the offending applicator.
- Collect weather records (temperatures, wind speed, wind direction, rainfall - for the date of application)
- Take photos (many). Record date and location on each photo. Repeat photos several times through the season.
- Document yield loss: Choose a similar planting (same age, cultivar, rootstock, etc.) Document yields and quality from the damaged area, and from an undamaged area.
- For perennial crops (eg. vineyards, orchards, asparagus, berries): Document the effects for several years after the damage occurred.
Weeds not only provide cover for diseases, insects but also compete for moisture, nutrients, sunlight and growing space needed by crop plant. Integrated Weed Management uses all available weed control strategies in the best possible way to manage weed population. Such strategies include cultural, mechanical and chemical methods of weed control. Anyone who has grown sweet potatoes knows that weed control is a very labour intensive process, with lots of time spent cultivating, both before and after planting. Some Ontario sweet potato growers are able to successfully manage weeds through the season exclusively by cultivating and hoeing. For those growers who chose to use chemicals, three herbicides are currently registered for use on sweet potatoes in Ontario.

Command 360 ME (*Clomazone*) is registered for use on sweet potatoes and it should be applied post-transplant, but prior to weed emergence, for control of many annual grasses and broadleaf weeds including velvetleaf, lamb’s-quarters, lady’s thumb, eastern black nightshade, barnyardgrass, green foxtail, yellow foxtail. Command can only be applied to sweet potatoes once per season and should not be applied within 95 days of sweet potato harvest. When applied at recommended rates, Command 360 ME will provide season long weed control. This product is broken down primarily through the activity of soil microbes, and may leave some residues that could affect subsequent crops. The product label lists re-cropping intervals for many horticultural crops after Command. Of particular concern to many sweet potato growers is the potential impact of a spring application of Command on rye cover crops planted in the fall after harvest. There were reports of bleaching and other injuries to fall rye planted after sweet potatoes last season, so keep this in mind if you plan to put in a cover crop this fall.

Dacthal W-75 (*Chlorthal Dimethyl*) is registered for weed control in Ontario sweet potatoes. Dacthal W-75 should be applied directly over transplants, prior to weed emergence, or as a layby application for up to 6 weeks post-transplant (any weeds present should be weeded and cultivated prior to application of Dacthal). Sensitive weeds include annual grasses and certain broadleaf weeds (lamb’s-quarters, purslane, common chickweed, redroot pigweed, carpetweed and ground-cherry).

Poast Ultra (*Sethoxydim*) plus Merge is the only post emergence weed control product registered on sweet potatoes in Ontario. This does not control sedges or broadleaf weeds and does not provide residual weed control. It can be applied for control of actively growing grasses. The time required for complete control is normally 7 to 21 days following treatment, depending on growing conditions and crop competition. Wait until the majority of grasses have emerged, because it does not control grasses that emerge after application. It should not be applied within 30 days of harvest. For rates and further details, refer to product labels or check OMAFRA Publication 75, Guide to Weed Control.

Regardless of the method of weed control you choose, it’s a good idea to look out for and keep track of what weeds you’re seeing in your fields – in a nutshell to scout for weeds just as you would for insects and diseases too.

Questions about sweet potato pests and their control can be directed to Ahmed Bilal, OMAFRA’s Integrated Pest Management Specialist, Specialty Crops at 519-426-4434 (email: ahmed.bilal@ontario.ca).

Weed control for Ontario sweet potatoes
Ahmed Bilal, Specialty Crops IPM Specialist
This year mullein bug numbers are extremely high in some apple orchards in the province. Mullein bugs (*Campylomma verbasci*) (Figure 4) overwinter as an egg inserted into the bark of the tree. Egg hatch begins at the pink to king bloom stage of Red Delicious and continues until petal fall. During warm weather, egg hatch usually occurs simultaneously, making management much easier.

Mullein bug (MB) nymphs (Fig 1) feed on developing flowers and young fruitlets, causing reddish pimples on the fruit. This damage eventually turns brown and becomes corky (Fig 2). Severe blemishes and malformation of the fruit caused by MB may decrease the marketability of the fruit. Mullein bug is only considered a pest from two weeks before and after the bloom stage of tree development, after which it becomes an important predator feeding on mite and aphid pests found in apple orchards throughout the summer.

Monitoring MB populations is very important at this time of year. Mullein bugs are monitored by tapping (Fig 3) the limbs of 25 trees, and recording the number of nymphs present. Nymphs can be easily identified from other common orchard pests (aphids, and leafhoppers) by carefully examining the insect using a hand lens. Aphids, always have the 2 cornicles or tail pipes, located on their rear (Figure 4), and leafhoppers (Figure 5) have more longer, narrow bodies. Insecticides for mullein bug are recommended if 7-9 nymphs are found in 25 traps. There are several good options for managing mullein bugs neonicotinoids such as Admire/Alias, Calypso and Actara are registered and research shows that Assail applied to control other pests in the orchard will provide subsequent control of mullein bugs. Generally Calypso, Assail and Actara are considered to have a longer residual than Admire/Alias, thus they may provide better control in years with cool wet springs when emergence is extended. These products may take slightly longer to kill the insects as compared to Diazinon. However, soon after application the insects begin to act woozy. Some reports from Michigan indicate that Calypso’s activity against mullein bug may not be as strong as Assail. While Diazinon is very efficacious against mullein bug, it is not considered to be IPM friendly and is harsh on parasitoids that help suppress tentiform leafminer populations.
Gypsy moth is once again making itself known in rural and urban forests as larvae are spotted crawling up tree trunks, feeding on leaves and moving across the ground searching for new trees to infest. Gypsy moth larvae will feed on leaves of oak, aspen, willow, alder, larch, mountain ash and other tree species. Significant defoliation can stress trees even where rainfall is adequate.

Many over-wintering tanned egg masses of gypsy moth were found this past fall and spring in areas around the province and entomologists are expecting lots of defoliation during June. In early June, larvae will range from just hatched, black, about ¼ inch long to about 1 ½ inches long with black hairs along the length, 5 pairs of blue spots and 6 pairs of red spots along their backs.

By mid to late June larvae can grow up to 2 inches long before pupating in July. One larvae can consume 12 to 15 large oak leaves to maturity. Adult moths will emerge later in July and August. After mating, each female moth will deposit only one egg mass of 100 to 1000 eggs in a foamy tan coloured mass which will lie dormant until next spring.

Some trees can re-grow a new canopy after springtime defoliation, however repeated or severe defoliation can kill trees. Young trees can be defoliated overnight by larvae that hide-out in ground cover during the day. Where larvae are numerous, large quantities of fecal matter falling from high atop deciduous canopies, bouncing off leaves and hitting ground cover or roof tops can make it sound like it is raining on a clear day. Older larvae will feed day and night, while the younger stages are mostly nocturnal.

City planners and forest managers may implement aerial spray programs this time of year to help reduce the populations of young gypsy moth larvae. A good website, as one example of a gypsy moth management strategy, is the Hamilton Conservation Authority’s gypsy moth web-page at www.conservationhamilton.ca/environment/land/gypsymothlifecycle.asp

In addition to lifecycle photos of gypsy moth and biological information, the web-page explains where and when aerial sprays are being applied with convenient maps, and the pest control product that is being sprayed. Each region has its own plan.

Typically, the organic insecticide Bt (Foray or Dipel) is applied by helicopter or aircraft for forest cover, air blast ground sprayers for tree nurseries, and is effective at reducing populations of the youngest gypsy moth larvae, while protecting beneficial species and other non-pest insects. For older stages of larvae in tree nurseries, the insecticide Spinosad (Success) may be effective and has some contact killing properties.

For methods of how to control gypsy moth on yard trees or in small deciduous plantations using non-chemical methods, the Hamilton CA website also presents guidelines and pictures on how to reduce gypsy moth infestations and protect trees from extensive defoliation.

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